

SECTION 01720 OPERATIONS AND MAINTENANCE MANUALS

PART 1 – GENERAL

1.1 SUMMARY

- A. The Construction Contractor shall furnish five original copies of the manufacturers' Operations and Maintenance (O&M) manual for equipment as specified. One complete O&M data manual shall be furnished prior to the time that equipment acceptance tests are performed. The remaining O&M data shall be furnished before the contract is completed. O&M data may be prepared by the equipment manufacturer and shall be submitted by the Contractor to the Contracting Officer's Representative (COR) as specified.

O&M instructions shall be legible and easy to read, with large drawings (when used), folded into the manual. Specific O&M data to be submitted shall, but not limited to, all approved project submittals and vendor data.

PART 2 - PRODUCTS

2.1 CONTENTS

- A. The equipment manufacturers' operations and maintenance data shall contain, as a minimum, the following information as applicable:
- (a) Maintenance and servicing instructions
 - (b) Parts list
 - (c) Repair and overhaul instructions
 - (d) Warranty documents

2.2 MAINTENANCE AND SERVICING INSTRUCTIONS

Maintenance and servicing instructions shall be provided for both preventive and corrective maintenance. Instructions shall include a list of test equipment, special tools, and materials needed for maintenance and service. This list shall include nomenclature, part/model number, application, range, and accuracy. Instructions should include illustrations to show how test connections are made. Actions and normal indications shall be shown for each test.

- A. Cleaning and inspection. - Periodic cleaning and lubrication information including types of cleaning agents and lubrication, and the frequency of lubrication and inspection intervals shall be included. Cleaning required during repair and shall be included in those appropriate sections.
- B. Inspection. - Instructions for inspection of equipment and frequency of inspection for damage and wear shall be provided with emphasis on allowable service limits such as wear, backlash, end play, balance, voltage, resistance, pressure, and/or length and depth of scoring.
- C. Troubleshooting. - Equipment malfunctions that may occur during operation shall be identified. Equipment troubleshooting data and fault isolation techniques shall include:

- (a) An indication or symptom of trouble.
- (b) The instructions necessary, including test setups, to determine the cause of the problem.
- (c) The action required restoring the roof.

The troubleshooting information shall be in a chart, logic tree, or tabular format with appropriate headings, or as a logic, block, or schematic diagram. Troubleshooting data shall include instructions suitable for identifying the lowest replaceable unit (LRU) that when removed and replaced will restore the equipment to operation.

2.8 PARTS LIST

The manual shall include a parts list containing positive identification of parts in the equipment item.

- A. Illustrated parts list. - Clear and legible illustrations shall identify component parts and parts relationship.
- B. Parts listing. - Part names and part numbers shall be shown on illustrations or tables. When the illustrations do not contain both part numbers and part names, the illustrations and the separate listing shall show either index reference, or key-numbers that cross-reference from the illustrated parts to a parts list. The parts list shall identify the actual manufacturer/vendor and the part number or generic description. Parts in the listing shall be grouped by assemblies, subassemblies, and modules with the parts identified to the assembly from which they are components.
- C. Common commercial parts. - Common commercial hardware and items that are not of special design such as bolts, washers, nuts, screws, fittings, keys, hinges, wire, cable, gasket material, tubing, and hose that are available from a wide range of sources shall be identified by part number or the notation "Commercial" instead of a part number. The part name including nomenclature or description shall be complete enough to facilitate substitution of equivalent items as shown below:

Examples:

<u>Figure No.</u>	<u>Part No.</u>	<u>Part Name (Nomenclature or Description)</u>
2-4	Commercial	Nut, hex head, plain steel, 1/4"-20 UNC-3BS
2-5	Commercial	Wire, electrical, copper tin plated, No. 14 AWG. 19 strands of No. 27 AWG, 0.250 in. dia.

- D. Recommended spare parts. - The equipment manufacturer or supplier shall provide a list of recommended spare parts that are required to support the operational use of the equipment for a one year time period. Recommended spare parts that are not "off the shelf" and have a delivery lead time greater than one month from receipt of order shall be so noted.

2.9 OPERATIONAL AND MAINTENANCE ILLUSTRATIONS

Manuals shall contain illustrations for locating and identifying all components significant to operations and maintenance. Line drawings, photographs or halftones shall show the configuration and parts relationship to aid in removal and disassembly procedures. Free hand sketches shall not be acceptable. Where appropriate, the manual shall contain the following diagrams:

- (a) Simplified functional block
- (b) Locator
- (c) Piping
- (d) Hydraulic
- (e) Schematic
- (f) Flow Control
- (g) Electrical
- (h) Process Flow
- (i) Instrumentation

Symbols used on illustrations or diagrams shall be ANSI standards or common to the trade or industry. Where nonstandard symbols are used, explanations shall be provided.

2.11 EQUIPMENT WARRANTIES

The O&M manuals shall contain warranty documents for all equipment items that are listed in the manual. The warranty shall specify the time that the warranty is in effect from final turnover by the Contractor to the COR. The warranty shall also include:

- (a) Name, address, phone number, and name of principal contact of the manufacturer or supplier.
- (b) Local authorized service agency of the manufacturer or supplier including name, address, phone number, and principal contact.
- (c) Manufacturer's warranty statement that specifies the scope of warranty coverage.
- (d) The manufacturer's specified method or procedure for obtaining warranty service.
- (e) Supplemental information regarding factors that might invalidate the warranty.

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01720

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